CASE REPORT
Association of angiomyolipoma and oncocytoma of the kidney: a case report and review of the literature
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Aim: The association between renal carcinoma and angiomyolipoma is rare. Only 14 cases have been reported in the literature. The purpose of this paper is to present an additional case and review the literature on this association.

Patient and methods: A healthy 42 year old woman was found to have a left flank mass incidentally when she presented for a Papanicolaou smear. The computerised tomography scan revealed a left lower pole renal mass consistent with a renal cell carcinoma. A nephrectomy was performed and the patient recovered uneventfully. The nephrectomy specimen was processed routinely. In addition to haematoxylin and eosin staining, immunohistochemistry for CAM 5.2, vimentin, CD34, antismooth muscle actin, and HMB45 was carried out. Transmission electron microscopy was also performed.

Results: Macroscopically, the lower pole of the kidney contained a well circumscribed, non-encapsulated, tan coloured tumour with a large area of central haemorrhage measuring 10.5 cm. In addition, there was a 0.4 cm poorly circumscribed unencapsulated yellow nodule adjacent to the tumour. Microscopically, the larger tumour showed characteristic features of an oncocytoma. Numerous mitochondria were seen on electron microscopy. The smaller yellow nodule was an angiomyolipoma.

Conclusions: This paper presents an additional case of oncocytoma associated with angiomyolipoma. Of the 15 cases described in the literature, three were associated with the tuberous sclerosis complex, all from a single study. In tuberous sclerosis, angiomyolipomas are more commonly associated with renal cell carcinoma. If angiomyolipomas are found incidentally in nephrectomy specimens together with other tumours, it is important to exclude tuberous sclerosis retrospectively.

The association between renal oncocytoma and angiomyolipoma is rare. To the best of our knowledge, only 15 cases have been reported in the literature (including our present case).1–7 In the case described by Schneck et al the oncocytoma was present in a partial left nephrectomy specimen. The right nephrectomy specimen showed a transitional cell carcinoma involving the pelvis and calyceal system, with an incidental cortical angiomyolipoma.3 Jimenez et al reported five cases, and one of these patients had multiple oncocytomas (oncocytosis).7 Oncocytomas have also been associated with cortical adenomas and renal cell carcinoma, whereas angiomyolipomas have been associated with renal cell carcinomas, a papillary adenoma, and a metanephric adenoma.2–7

CASE REPORT
A 42 year old asymptomatic woman presented for a routine Papanicolaou smear and was incidentally found to have a left abdominal mass. She was unaware of the mass and denied any pain, haematuria, or loss of weight. There was no significant medical history, specifically seizures or mental retardation. On examination, the head, neck, heart, and lungs were normal. Neurological testing gave normal results. Abdominal examination demonstrated a left flank mass that was firm and moved late on respiration. Creatinine, electrolytes, and haemoglobin were normal. The chest x ray was normal. Ultrasound showed an 11 cm mass in the left lower pole of the kidney with no associated adenopathy. Computerised tomography with contrast enhancement confirmed these findings and also found the left renal vein to be clear of tumour (fig 1). The right kidney was unremarkable radiographically. A working diagnosis of renal cell carcinoma was made.

Left radical nephrectomy was performed and the patient recovered uneventfully.

METHODS
The nephrectomy specimen was fixed in 10% buffered formalin and processed in a routine manner. Immunohistochemistry was performed on the formalin fixed, paraffin wax embedded tissue using the streptavidin biotin complex technique after microwave retrieval. The following antibodies were used: CAM 5.2 (dilution, 1/20; monoclonal; Becton Dickinson, Oxford, UK), Vimentin (dilution, 1/300; monoclonal; Dako, Glostrup, Denmark), antismooth muscle actin (dilution, 1/500; monoclonal; Dako), anti-CD34 (dilution, 1/50; monoclonal; Dako), and HMB45 (dilution, 1/50; monoclonal; Dako). In addition, transmission electron microscopy was performed.

PATHOLOGICAL FINDINGS
Macroscopic findings
A nephrectomy specimen measuring 18 × 11 × 8 cm and weighing 726 g was received. On sectioning, in the lower pole...
of the kidney, there was a well circumscribed, non-
encapsulated, tan coloured tumour, with a large central area of
haemorrhage, measuring 10.5 cm in diameter. There was no
evidence of necrosis, perirenal fat involvement, or involvement
of the renal vein. In addition, there was a 0.4 cm poorly
circumscribed yellow nodule adjacent to the
tumour (fig 2).

Microscopic findings
Sections of the kidney showed a well circumscribed tumour
composed of cells with abundant granular eosinophilic
cytoplasm growing in a tubular manner (fig 3). The nuclei
were small, round, and regular with a centrally placed nucleo-
lus. Focal nuclear pleomorphism was noted, although there
were no mitotic figures present. There was no evidence of a
papillary architecture, areas of clear cell carcinoma, or
sarcomatoid or spindle cell areas. There were areas of stromal
hyalinisation, myxoid change, and haemorrhage, but there
was no evidence of necrosis. The tumour cells were positive
with CAM 5.2 and negative for vimentin.

The adjacent renal parenchyma showed a non-
capsulated, irregular tumour displaying mature adipose tis-
sue, smooth muscle, and blood vessels (fig 4). The last two
components were highlighted by the antismooth muscle actin
and CD34 immunostains, respectively. The smooth muscle
component showed some nuclear pleomorphism and hyper-
chromasia. The features were those of a renal angiomyo-
lipoma. The HMB45 stain was negative in this case.

Electron microscopy
The cytoplasm of the cells in the larger tumour was filled with
mitochondria (fig 5). The diagnosis of an oncocytoma was
made.

LITERATURE REVIEW
Table 1 lists the available details of the other published cases.

DISCUSSION
Renal oncocytomas, first described by Zippel in 1942, are
benign, relatively uncommon neoplasms accounting for 3–5%
of renal parenchymal tumours. Most of these tumours are
The perivascular epithelioid cell is thought to be the cell of origin of angiomyolipomas. Although renal angiomyolipomas, like other tumours derived from the perivascular epithelioid cell, are characteristically positive for HMB-45, a epithelioid cell, are characteristically positive for HMB-45, a...
REFERENCES

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Notes